
Ependymal stem cells divide asymmetrically and transfer progeny into the subventricular zone when activated by injury.

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Public Summary:

Scientific Abstract:

Evidence is presented to show that cells of the ependymal layer surrounding the ventricles of the mammalian (rat) forebrain act as neural stem cells (NSCs), and that these cells can be activated to divide by a combination of injury and growth factor stimulation. Several markers of asymmetric cell division (ACD), a characteristic of true stem cells, are expressed asymmetrically in the ependymal layer but not in the underlying subventricular zone (SVZ), and when the brain is treated with a combination of local 6-hydroxydopamine (6-OHDA) with systemic delivery of transforming growth factor-alpha (TGFalpha), ependymal cells divide asymmetrically and transfer progeny into the SVZ. The SVZ cells then divide as transit amplifying cells (TACs) and their progeny enter a differentiation pathway. The stem cells in the ependymal layer may have been missed in many previous studies because they are usually quiescent and divide only in response to strong stimuli.

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